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Biography

MR. WILLIAM ARTHUR POOL, M.R.C.V.S.

THE transference of Professor Gaiger to the Chair of Comparative Research at the Liverpool University left a vacancy on the Animal Diseases Research Association for the position of Director, which has now been filled by the appointment of Mr. W. A. Pool, M.R.C.V.S., who was formerly the Senior Research Assistant.

Graduating from the London College in 1911, where he held the position of House Surgeon, he joined the Indian Civil Veterinary Service in 1912, holding several important research appointments until his retirement a few years ago.

After leaving India Mr. Pool took a course of Post-Graduate Study in Cambridge and at the Pasteur Institute in Paris, and in 1924 he took up the permanent appointment of Senior Research Assistant to the Animals Diseases Research Association, whose Controller was then Professor Gaiger.

Mr. Pool's reputation for reliable, steady work is well known, and the profession in Scotland and the North of England look to him to keep up the reputation the Association has already gained. The veterinary profession in other parts of England has its eyes upon him, too, to carry on the good work which his predecessor has pioneered and inaugurated.

Editorials

A NEW BRANCH OF THE NATIONAL VETERINARY ASSOCIATION.

FROM Kenya Colony comes the good news that our colleagues out there have realised the value of combination and have formed the "Kenya Colony and Protectorate" Branch of the National Veterinary Association. The start has been made in the proper orthodox fashion, by at once recognising the power of our motto: "*Vis Unita Fortior*" and requesting immediate recognition by, and affiliation with, the Central parent body.

Lt.-Colonel A. G. Doherty, M.C., the Chief Veterinary Officer of Kenya Colony, is the first President, whilst the enthusiasm which marked the proceedings of the inaugural meeting can distinctly be

traced by those who knew him in England, to the indefatigable first secretary, Major Brassey Edwards, now a Justice of the Peace and Senior Veterinary Officer to the Colony.

The proceedings and the inaugural address have reached us in full detail, but, unluckily, too late for publication in this present issue. They are, however, full of " vim " and if this branch only continues with the same enthusiasm with which it has begun, the national parent body need have no fear for the future of its latest infant offspring.

MEAT INSPECTION AND THE VETERINARY PROFESSION.

Our contemporary, the " Meat Trades Journal," expresses in an editorial its dissatisfaction, in no unstinted terms, of the unsatisfactory way in which the new meat regulations are being carried out, and the incompetency of many of the present-day meat inspectors; a fact of which members of the veterinary profession have been aware for a number of years. Quoting from the editorial paragraph, we read : " It is evident, too, that the inspection that does take place in some districts is not always in the hands of capable men." Again, " Meat inspection is still in a chaotic condition. There is no uniformity. One place is overdone, even to wastefulness ; in another it is carried out efficiently and with equity ; in others no inspection at all or none worthy of the name. If medical officers of health and inspectors, instead of abusing the retailer . . . would put their own house in order and prevent diseased meat leaving the slaughter-house or abattoir, they would be doing a real service to the community."

That these phrases are, unfortunately, absolutely true, is well known to every member of the veterinary profession, and why the authorities in England do not recognise what Scotland and every civilised European country has already recognised, viz., that one profession only—the veterinary—is pre-eminently capable from its everyday work and scientific training to utilise to the best advantage of the Public Health Service its knowledge of the diseases of animals for the purpose of ensuring a good, clean, meat supply. Scotland has again, as usual, forged ahead, but, with the exception of a few of our larger cities, England still lags behind in this, one of the most urgently-needed reforms.

It is lucky that we in Great Britain cook our food well before eating it ; but on rational grounds, as well as every other ground, it is necessary that our food supply should be pure ; in so far as meat is concerned there is no question but that the veterinary graduate is the best fitted by his training and qualifications, to guard the public from harm in this direction.

General Articles

PUERPERAL FEVER.
A STUDY IN COMPARATIVE PATHOLOGY.

By LESLIE PUGH, B.Sc., F.R.C.V.S.,
Sevenoaks.

(*Continued.*)

C. DETAILS OF THE COMPARISON.

It is now proposed to examine in more detail certain features of the table set out above. No one will wish to deny that we are dealing with a metritis whether bovine or human. Nor is it in question that this form of metritis is properly described in both cases as puerperal. But the remainder of the comparison needs more searching examination.

(1) *Normal Pregnancy.*—If human puerperal infection be envisaged as offering no more complex questions than can be explained by the introduction of septic hands or instruments into the parturient uterus, there is little need to attach importance to the normal pregnancy which precedes this unhappy accident. But this view is not now universally held. Many find evidence of other and less obvious factors at work. What are these factors? When are they first in evidence? From human pathology there is no definite reply to such questions. Here, perhaps, animal pathology can assist. In Appendix 5 are given brief details of a farm on which puerperal fever was endemic. The owner purchased six cows in the later months of pregnancy, all in good health and from different healthy farms. These he kept on his infected farm for a few weeks pending the arrangement of accommodation in a more healthy area. They were then moved to this new area and in due course gave birth to living and healthy calves. But five of the six retained their placentas and the calf of the sixth suffered from the "scours," which is associated with coli infection in the mother. It is not unreasonable to conclude (especially as this is not an isolated incident) that these cows acquired the infecting agent of puerperal fever on the infected farm during their short sojourn there and at a date preceding pregnancy by at least eight weeks. Nevertheless, they were apparently healthy up to the time of parturition and the calves were born normally and were themselves normal. From this it seems evident that the infective agent was not actually in the uterus during the time which elasped between its acquisition and parturition. It was, perhaps, in the intestinal canal, but no exact evidence is available nor can at present be expected.

Whether any similar train of events occurs in human beings is quite unknown so far as the writer has been able to discover. But once the possibility is recognised we may hope for the discovery of relevant facts which might prove of quite unanticipated importance.

(2) *Normal Parturition.*—Normal parturition in the cow is a physiological function which is unassisted by man and uncomplicated by any form of manual interference. When, in such cases, the retained placenta is found—so early as four hours after labour (see Appendix 3) —to give a pure culture of coliform organisms and to show on slides that the infection is already general in the placenta, the inference is irresistible that the infection preceded the act of parturition. This is further evidenced by the fact that the discharge which can be collected from the uterus even so soon after birth has characteristics which are quite recognisable.

Nevertheless, the act of parturition is usually normal in such cases so that the endometrium itself can hardly be much involved. But here we have just such an exception to the statement that parturition is normal as might be anticipated if our argument is following the right lines. Long before this paper was thought of, and before any bacteriological work had been done, it was noted that cases which subsequently showed retention of the placenta were apt to be distinctly longer in labour than others, although there was no mechanical obstruction to account for this. We are entitled to assume that this is due, when it occurs, to a relatively advance infection (or possibly intoxication) of the uterine muscle leading to insufficiently effective contractions.

Nor is evidence wanting of other cases in which infection, although presumably present, as judged from subsequent events, is yet not sufficiently extensive to cause retention of the placenta. This was probably the case in the sixth cow mentioned above (page 8).

Thus a close examination of the occurrences in the cow about the time of parturition seem to justify the statement that (in cases which subsequently show puerperal fever) there is an infection present in the uterus before parturition. This is sometimes so severe as to lengthen the period of labour, usually extensive enough to cause retention of the placenta and rarely so slight as to give no sign of its presence until a putrid discharge sets in.

In the human being parturition is commonly associated with some form, however slight, of manual interference or at least with possibilities of contamination of the vaginal mucosa. Possibly this is not the case among primitive races, but we do not know of any figures which tell of the incidence of puerperal fever amongst such races. Amongst civilised races the measure of our civilisation is

also a measure of the extent to which we seek to guide and control the process of parturition. So it comes about that normal labour, the simple physiological and rapid process which obtains amongst cattle, is relatively infrequent amongst human beings.

Nevertheless, we have some information about simple unattended labour and also about labour which has been rendered as nearly an aseptic process as our knowledge and anatomical conditions permit. In both cases we can say with assurance that puerperal fever can occur. Indeed, Winter[33] was able to satisfy himself that the uterine infection preceded labour, and the older clinical observers before the days of bacteriology were at least compelled to admit the existence of infection not brought from without. (Semmelweiss[27]).

We get in this way a glimpse of conditions within the human uterus which might be expected to delay labour as in cattle. We can hope for little more from this line of argument at present, since the different features of labour, delay, infection, etc., have not yet been co-ordinated.

(3) *Retention of the Placenta.*—Retention of the placenta is an almost inevitable feature of uterine infection in parturient cattle. Infection leads to vascular reaction and so to swelling. Swelling tightens the normal interlocking of the fœtal and maternal parts of the cotyledons and, in fact, the latter are commonly seen to hold the fœtal portions in a tight embrace (see also Appendix 1).

No such condition of affairs is possible in the human placenta, but in spite of this fact it might well be expected that inflammation, such as causes retention in cattle should, perhaps by a different process, effect at least a partial retention in human beings.

Pursuing this line of enquiry we do in fact find that placental adhesions leading to retention of portions of this organ are fairly frequent in human beings. We can even say that the occurrence of puerperal fever is often assumed to be evidence of the presence of retained products. The practice of immediate curettage is based on this view. But once more we are defeated by a lack of precise information, which might relate the frequency of retained products to puerperal fever or to any one particular form of it.

We have already noted that retention of the placenta in cows is evidence of the presence of infection and must now seek to discover whether the retention of even small portions of the placenta in human beings has a like significance.

It is not easy to obtain information on this point, since opportunities for early bacteriological examination of retained products are almost as rare as opportunities for their histological examination *in situ*. Williams[33] is silent upon the point and so are various other books

which we have been able to consult. The following note is extracted from Galabin[6]:—

> "Morbid adhesion occurs from failure in the development of this areolar layer, or its replacement by fibrous tissue, or from unusual firmness of the bands forming the trabeculæ. Any of these conditions is usually the result of previous endometritis, which may be syphilitic or not."

But this pronouncement was made 20 years ago and, although supported by other writers of that date, *e.g.*, Herman[2], cannot be considered to be of any very definite significance. The researches of Schweitzer, [25] moreover, which are of more recent date do not quite bear out the suggestion of an inflammatory origin of adhesions.

One is tempted to bring into evidence a further statement of Galabin[6] that retained products are usually followed by symptoms of septic absorption (p. 447), but it is very doubtful whether the sequence of events which is here referred to is in any way analogous to the early coli infection of bovines with which we are now concerned.

On the whole question of retained placenta we are therefore obliged to admit that evidence of its significance in human beings is very slight and inconclusive and cannot properly be used to support the comparison which this paper seeks to institute. It is possible that further enquiry might prove interesting and might even afford valuable support, but until that enquiry is made the significance of retained products in relation to puerperal fever must remain an open question.

(4) *Subinvolution.*—Involution of the human uterus is a process by which that organ loses weight and bulk. But weight is impossible to estimate in the living and bulk can only be determined in a way which leaves much room for error, and makes mathematical precision impossible. It has thus come about that the presence of subinvolution (as opposed to its extent) is often estimated by indirect factors such as the tone of the uterine muscle, the patency of its cavity, the symptoms to which it gives rise, the retention of discharges, etc. But in the cow the estimation of sub-involution is easier. The uterus is bicornuate, and comparison between the two horns is easy. Moreover, the cavity is relatively huge and alterations in its capacity and in the tone of the muscle are readily appreciated.

The actual findings in the cow in relation to puerperal fever are as follows. With the placenta *in situ*, the uterus is, of course, large and uncontracted. If we assume that size and defective contraction are proper indices of sub-involution, it is sub-involuted. If the placenta remains *in situ* (as it may do for several days) sub-involution continues. If it be removed, the uterus tends to contract down

behind it, and at the end of the operation is reasonably firm and much reduced in capacity. So far the analogy with human cases is complete. But examination of a large number of cases gives one the impression that in retention from infection such as is here discussed, the subsequent involution of the uterus is distinctly delayed. This delay is apparent from the beginning, from the earliest examination, and appears to be an index of the extent of the infection, *vide* Williams, [34] (Cornel). If this is true, it is additional evidence of the very early stage at which infection of the uterine wall is present. It tends to support the statement that in these bovine cases infection precedes delivery. But in human cases, the precise significance of sub-involution is less easy to discern. It is spoken of as present by most authors. But does this really mean anything more than that the uterus is larger than normal as it well might be when infection is established—to which stage alone most authors seem to refer.

In support of the comparison with cattle one would wish to find evidence that involution was definitely delayed during those three to four days after labour which usually supervene before the onset of acute puerperal fever. It is not apparent that this evidence is really conveyed by the bare statement that sub-involution is present. If that statement is taken at its face value it does mean that involution, which should have been proceeding normally and already have become recognisable, has not taken place to a normal extent. But one cannot be sure that those who make the statement have in mind anything further than that the uterus is actually found to be large—which might as easily be due to the infection as to sub-involution.

It results that once again we are faced with an inconclusive comparison and, in particular, with one which does not throw definite light on the likelihood of some factor interfering with the physiological lessening of the uterus before the onset of acute infection. There is just enough evidence to hint at the possibility of the presence of some such factor but no more. If there be any such factor in human beings it may possibly be a hitherto unsuspected primary coli infection of low virulence (or coli intoxication), judging from the analogy with cattle.

Only a prolonged series of examinations of the uterus itself immediately after labour or during the following two days can ascertain the truth of the matter.

(5) *Coli Infection.*—Reference to Appendix 3 will show that in the cases of retained placenta in cattle with which this paper deals, early examination gives evidence of pure coli infection. Such cases as are examined by veterinary surgeons are not often followed by serious symptoms because simple methods of treatment prove quite

adequate. But other cases occur in which the retention of the placenta is overlooked or neglected until septic invasion and acute puerperal fever supervene. In these streptococci predominate. In intermediate cases the coliform organisms are less frequent and the streptococci more numerous according to the period which has elapsed since labour. The actual retention of the placenta is, then, associated with coli infection, which would probably be overlooked if this very evident sign of its presence were not available.

In human cases retention of the placenta is not a feature of the disease, and there has been no particular reason to suspect that anything abnormal is present until symptoms occur on the third or fourth day. In consequence the possibility of a preceding and predisposing coli infection or intoxication may have been widely overlooked. One supposes that, in cattle, the primary coli infection predisposes to secondary invasion by providing a favourable nidus, by preventing proper contraction of the uterus and possibly in other ways which have yet to be discussed. It is regarded as an essential factor in the production of the septic type of fever which comes later and which seldom occurs in cases in which the placenta has not been retained.

The septic fever of human beings has not been regarded as requiring any such predisposing factor and examinations are not made prior to the third or fourth day. Nevertheless, even these relatively late examinations often show coli infection and the following paragraph from Williams'[33] Obstetrics is suggestive :—

> " Ordinarily pure colon infections are relatively benign in character, but occasionally, as shown by Lenhartz and others, fatal septicæmia may ensue. In most serious colon bacillus infections the organism is associated with the streptococcus, and it appears that such a combination tends to augment the virulence of both species of bacteria."

If we have not here evidence of a preceding coli infection, we have at least a realisation of the fact that the relationship between these two organisms in puerperal fever is more intimate than one would necessarily expect. It is at least possible that this increase of virulence is really an index of the more rapid growth of streptococci (leading to increased absorption of toxin) which is allowed by the devitalisation of tissue associating with a preceding coli infection.

As stated in Appendix 3, certain particularly virulent strains of coliform organisms may be acquired by animals some time before parturition and probably remain localised to the intestinal tract or elsewhere until some opportunity occurs to infect the uterus—such an opportunity as might well be afforded by the changed nutritional

and other conditions associated with the last days of pregnancy and the first days of the puerperium.

There is some evidence that the human being is liable to coli infection of the urinary tract during the later part of pregnancy.

The following paragraph is taken from a recent Synopsis of Midwifery[15]:—

> "X. Severe pain in the right lumbar region radiating downwards into the iliac fossa: malaise, pyrexia, offensive urine. The condition is probably pyelo-nephritis, said to be caused by pressure of the gravid uterus on the ureter (usually the right). The affected kidney will be found enlarged and tender: the ureter as felt per vaginam is also inflamed and sensitive to pressure, the bacillus coli and pus are always found in the urine and occasionally blood."

This form of pyelitis is described as one of the disorders of pregnancy, and its relative frequency in this condition is generally recognised, although it also occurs in children and at other times. That it is almost invariably a coli infection is also generally accepted.

Although the supposed effect of pressure of the uterus on the ureter is commonly referred to, it remains little more than a conjecture, perhaps founded on the fact that the complication usually occurs in the latter half of pregnancy, nor can it explain the onset of pyelitis after parturition.

There is, then, some evidence that the colon bacillus finds in pregnancy conditions particularly favourable to its pathogenic activities. While it is not intended to exaggerate the importance of such relatively remote evidence, there can be no doubt that, in the light of findings in cattle, the constant association of coliform organisms with a definite complication of pregnancy is an interesting and suggestive fact.

(6) *The Putrefactive Form of the Disease.*—A return to more strictly clinical bases of comparison affords, as one would expect in the present state of pathological knowledge, some closer and more detailed parallels.

The putrefactive form of the disease in animals occurs in direct sequence to parturition. The retained placenta may be putrid within a few hours and is always so by the end of 24 hours (this, however, is not the case in Bang's disease). The putrid smell can certainly be associated with a pure colon infection and is presumably due to this agent, even in mixed infections. The offensive nature of coliform infections is well recognised in other conditions. There is thus in cattle a sharp distinction between this and the septic form in the time at which it originates.

In human beings infection leading to alarming symptoms within

the first two or three days is very rare, and in the absence of such symptoms there is little reason to suspect infection at this time. The writer has been unable to discover from current literature whether the type of puerperal fever designated "putrid endometritis" by Williams[33] is associated with early development of a putrid smell. This author remarks: "In putrid endometritis we *may* likewise have the initial chill and the high temperature, but the patient's condition does not usually appear so serious as in the septic form." It would appear that in some cases, if not in most, the symptoms are of more insidious onset and perhaps comparable with those seen in cattle.

It is certain that the contrast between a profuse and foul-smelling discharge in the putrefactive form and a discharge which is often scanty and not necessarily offensive in the septic form holds good in both cattle and human beings. It is equally certain that this contrast depends on some difference in the bacteriology of the condition. Since this difference is found to be due in cattle to the part played by the coliform group, it is more than likely that it is thus caused in human cases also.

All writers are agreed that the putrefactive form is more benign than the septic, and this is equally true in cattle.

Since in cattle this form seems always to precede the septic form, it is reasonable to premise that it predisposes to it. This might well be the case, not only in view of the local conditions created, but also because it causes straining movements in cattle which may possibly assist the aspiration of contaminated material from the vagina which, as in human beings, may easily be infected from the anal region. It is a common observation that a cow may strain and the tip of the placenta appear and become contaminated with fæces and then be withdrawn into the vagina.

The mere fact that there are two forms of the disease which can easily be confused and which have in fact been so confused in medical and veterinary literature up to recent years affords a further reason for supposing that bovine and human puerperal fever are the same in all essentials.

Combined with the definite bacteriological findings in animal disease and with the suggestive clinical and other analogies in human cases, this argument for identity is greatly strengthened and seems to the writer to be at least so strong as to justify further exploration of the possibilities.

(8) *The Acute or Septic Form of the Disease.*—In cattle the distinction between the two forms of the disease, not only in time of onset, but also in character is fairly sharp. It would appear that this is less often the case in human beings. But both agree in that the

onset of acute symptoms seldom occurs before the third or fourth day, these symptoms including fever, malaise and often a rigor. The uterine discharges in women may be lessened and are rarely, if ever, profuse at the onset, but bacteriological examination commonly shows a predominance of streptococci. These may be in pure culture or mixed with other organisms.

It should perhaps be mentioned that the gonococcal form of puerperal fever has no analogy in cattle, and for the purposes of this paper has been regarded as a separate disease which is not for the moment under discussion.

The three days latent period above referred to is of considerable interest and it is natural to enquire as to what is happening in the uterus during this time. There is a widespread belief amongst obstetricians that the acute symptoms of the third or fourth day depend on infection introduced at the time of parturition and, if the same latent period held good in those days, this opinion is supported by the hospital epidemics which so roused the ire of Pasteur. If this be granted the streptococci are developing during the first few days, but their toxins do not gain access to the blood stream. This suggestion is further strengthened by the fact that a culture on the fourth day for example, shows a considerable extent of infection.

We are aware from the various other forms of streptococcal infection in animals and man that these organisms vary very much in the period which elapses between their gaining access to the body and the development of symptoms. The very acute forms such as those which occur in medical men and nurses as the result of operation or *post mortem* infections may have no more than a few hours latent period. On the other hand, scarlet fever, which is commonly thought to be streptococcal, has a definite incubation period comparable to that of puerperal septic fever. This difference in latent period might be due to some peculiarity in the particular strain or organism or it might depend on some extraneous factor. The explanation most readily to hand is undoubtedly that in scarlet and puerperal fevers the infection is not inoculated, but reaches a mucous surface or a surface more or less protected by serous effusion, etc., whereas in the " operation " infections there is commonly direct inoculation by the prick of a needle, etc.

It seems to the writer that these explanations, conjectural though they are, do, nevertheless, assist us in forming a clearer mental conception of the factors which determine the course of the disease. It is evident that the occasional acute fever of the second or even the first 24 hours might be explicable as due to actual inoculation on an abraded uterine or vaginal surface, whereas the more common

third or fourth day fever accords with the knowledge that actual inoculation into the blood stream is not greatly favoured by the mechanical measures ordinarily employed, *e.g.*, manual or instrumental interference. It is also evident (and this is the point to which the foregoing paragraphs are directed) that the fact that cattle show a generally sharper distinction between the putrefactive and septic forms of the disease can be co-related with the fact that they are much more frequently immune from operative procedures and so from direct inoculation into the blood stream.

In all other features the septic form of puerperal fever seems to be identical in human beings and in cattle ; there is the same likelihood of rapid spread to the peritoneum, perimetric tissue, etc., there is the same probability of a fatal result.

(10 to 14).—The details of the comparison under these heads require no further elucidation, or are dealt with elsewhere in this essay.

(*To be continued.*)

NOTES ON A FEW BOVINE DISEASES DEALT WITH BY THE EGYPTIAN VETERINARY SERVICE.

By D. S. RABAGLIATI, O.B.E., B.Sc., F.R.C.V.S.,
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OFFICIAL reports are usually very dull reading ; hence, the author feels that for those interested in the bovine diseases of Egypt no apology is required for the following resumé of the activities of the Egyptian Veterinary Service, in so far as they concern cattle pathology. The ox is by far the most important animal in Egypt—at least this is true of the cultivated areas of the country—so that the Egyptian Veterinary Service has paid special attention to bovine ailments.

CATTLE PLAGUE.

Egypt being " the land of paradox "—the country of anomalies and anachronisms—it will not be considered contradictory to say that this great scourge has been the best friend to the veterinary profession in the land of the Pharaohs. By this, let it be understood, is meant that the presence of cattle plague has given the Veterinary Service the chance of showing what it can do—and it has not been neglectful of its opportunities—and has provided funds whereby the service has been gradually built up to its present organisation. The first outbreak in recent years commenced in 1903 and raged until 1905, when it died down only to become alarming again in 1907. It continued intermittently until 1916, when it decreased to very small dimensions until 1918, when, owing to causes connected with

the war, another recrudescence occurred which lasted until 1924. After a severe outbreak in Upper Egypt in 1923 it once more became quiescent and has remained so until the present time.

Cattle Plague in Egypt only attacks cattle and buffaloes ; although comparatively few of the latter have succumbed to the disease as compared to the losses encountered in cattle. So slight has this loss been in the case of the buffalo that of late years this animal has not been inoculated against the disease during the great campaign of double inoculation carried out amongst the cattle of the country for its suppression. Cattle Plague has been responsible for the loss of probably more than a million head of cattle since the 1903 outbreak, although, thanks to the efficiency of the simultaneous inoculation, losses in recent times have been very small compared to what was the case in the early years of the outbreak. In 1903 inoculation with blood and serum was tried with disastrous results as the serum used had been purchased from abroad and was found to be practically useless. A Serum Institute for the manufacture of this serum was established in Cairo in 1903, and with the exception of six years, including four years during the war, has been in existence ever since on a larger or a smaller scale according to requirements.

After the unfortunate results of the 1903 inoculations, only the "serum-alone method" was practised until about 1911, when a few cattle were subjected to the simultaneous treatment. This proved to be so successful that it was gradually extended so that in recent years no other system has been tried and very large areas of the country have been systematically treated by inoculating all the cattle in the districts selected by the double method. The death rate from all causes following this inoculation has been reduced to about 0·05 per cent., which may be considered to be practically nil. No greater advertisement of the success of the method can be given than the fact that formerly cattle could only be injected with the aid of a large force of police to compel the owners to bring up their stock, whereas now the native cattle owners clamour for serum whenever the disease has been reported in a district. The immunity produced by this inoculation is practically life-long in the case of adult cattle and the writer knows of no case in which cattle so treated have lost their immunity and been attacked by the disease.

Cattle Plague generally occurs in the acute form in Egypt with a death rate of anything up to 90 per cent. of the animals attacked when it is a new area of the country which has been infected, although the losses may be as low as 20 per cent. when the disease has been present in any one district for a long time. Cattle in several villages and even provinces have been nearly wiped out on some occasions,

but owing to the ever watchfulness of the veterinary service such losses are not now met with. A chronic type of the disease has been demonstrated in cattle imported from the Sudan, which, however, seems to be equally contagious and may give rise to an acute form of cattle plague in in-contact animals. As these Sudanese cattle are only imported into Egypt for immediate slaughter and are now carefully quarantined, infection to native cattle from such sources does not occur.

Tuberculosis.

Tuberculosis is unfortunately a very common disease amongst the cattle, and to a lesser extent the buffaloes of Egypt. There is probably not much difference in its incidence from that existing in Great Britain. But little has been done to reduce its ravages, partly owing to the difficulties that would be encountered, but chiefly on account of the cost that its eradication would entail. To give some idea of its frequency, tests which were carried out in 1920 on a herd of working bulls and bullocks on some Government farms showed an infection of 53 per cent. as indicated by the tuberculin test. Statistics of cattle and buffaloes slaughtered in the Cairo and Alexandria abattoirs in 1921-1922 show that out of 47,568 animals slaughtered (not including calves), 4,444 (9·3 per cent.) were condemned in whole or in part for tuberculosis. This is probably much too low a figure for Egyptian cattle as the total includes many thousands of Sudanese animals, in which cattle the disease is practically unknown; and, moreover, the cattle killed in these towns are of a better quality than those slaughtered in the villages where the percentage affected would be somewhat higher. In a test carried out at the Serum Institute on the bulls used for serum production, 14·7 per cent. were found to be tuberculous, but here again it must be remembered that these cattle were selected ones, only the best type of animals being used for this purpose. The fact that Egyptian cattle, although out of doors the whole year, are housed at night, often in very crowded and badly ventilated premises, no doubt accounts for the high incidence of tuberculosis, whereas the Sudanese cattle are never housed at all and are thus almost free from the disease.

Foot and Mouth Disease.

There have been several outbreaks of this in recent years, some of which have been extensive. The slaughter policy has never been attempted in Egypt, nor is it necessary or even feasible, for the foot and mouth is of a mild type and has always been controlled by isolation (? sic). The measures adopted for its eradication have been the prevention of movement, the closure of cattle markets in

the infected zones, tying the affected animals out in the open and the treatment of the diseased by means of foot baths or by astringent antiseptic sprays applied to the feet. The greatest danger of this disease has always been the risk of deformities occurring on the hoofs, which damage the working capacity of the cattle.

Contagious Pleuro-Pneumonia.

Egypt has suffered from the ravages of this plague on more than one occasion, though no outbreak has occurred within the last 22 years. The only cases now met with are in Sudanese cattle in the quarantine pens, amongst which it is fairly common. The chief type encountered is of a very chronic character, usually only being manifested after slaughter. Inoculation against this scourge has, therefore, not been practised.

Anthrax.

Egypt has been singularly free from severe outbreaks of anthrax, so common in some hot countries. Sporadic cases are the most common, but on some occasions considerable losses have occurred in villages where many animals have died. Although both cattle and buffaloes are affected, by far the greater number of cases occurs in the quarantine parks in imported sheep. The use of anthrax preventive serum has not been resorted to except in rare instances.

Septicæmia Hæmorrhagica ("Barbone").

This disease has given cause for considerable anxiety from time to time. It chiefly occurs amongst buffaloes in the subcutaneous or œdematous form, but also numerous cattle are carried off annually by the acute septicæmic type. The disease invariably breaks out in the autumn when the Nile floods are subsiding, owing to the animals drinking from stagnant pools formed as the Nile falls after its annual flood. In late years the veterinary service have prepared a serum from hyper-immunised horses and cattle which has given good results as a preventive when used on infected lands.

Stiff Sickness (Three Days' Sickness).

This peculiar disease, apparently the same as that reported by Bevan and others in South Africa, has on one or more occasions visited Egypt. The most severe outbreak occurred in 1909, when it commenced in Assuan and travelled down the Nile valley until it reached the sea, affecting enormous numbers of cattle on its track. As the name implies, it only lasts for about three days, but while it lasts it is very alarming to the novice, for the affected cattle appear

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very ill. It is rarely fatal and, other than bringing about a loss of flesh and milk yield, it seems to leave no complications in its train.

Rabies.

Rabies has been demonstrated in cattle on one or two occasions, but from its rarity hardly calls for special note so far as it concerns the ox.

Texas Fever.

A very common disease in the country and due to *Babesia bigemina* (*Piroplasma bigeminum*). Although almost universal in cattle, it has only on rare occasions been demonstrated in the buffalo. The condition is so widespread that practically every calf becomes infected at an early age and thus obtains a tolerance against the disease. The ticks known to carry the disease in Egypt are *Hyalomma egyptium*, *Margaropus annulatus*, *Rhipicephalus evertsi* and *Boophilus australis*. Notwithstanding the tolerance commonly manifested by healthy cattle, considerable outbreaks often accompanied by a high death rate do occur from time to time when from subsidiary causes the animals' tolerance is weakened or broken down. In fact, this has been one of the greatest dangers following the simultaneous inoculation against cattle plague; for the reaction to the cattle plague virus may so reduce the tolerance to this disease that an acute attack of Texas fever may develop with often fatal results. This can only be guarded against by using a sufficient dose of a highly potent serum. Excellent results in the prevention have been brought about by the use of sprays on farms known to be badly tick-infected, using some recognised cattle dip as the spray. As a curative and preventive after the double inoculation, arrhenal (disodium methyl arsenate) given subcutaneously has been most efficacious, but by far the best specific for its cure is Trypan blue injected either subcutaneously or intravenously.

"Egyptian Fever."

By this term I refer to a very prevalent condition, namely, the infection of the blood by *Theileria mutans*. This disease is thought to be transmitted in Egypt by *Hyalomma egyptium* and *Boophilus annulatus*, both common types of tick. The parasite can be found in the blood of most healthy Egyptian cattle if sufficient search be made, but generally increases in numbers when an animal is suffering from fever or other debilitating conditions. The disease is rarely fatal in native cattle, but in imported ones it is frequently responsible for death. The fever produced is usually a long and often an intermittent one with no very definite symptoms other than the temperature

curve and progressive emaciation. Diagnosis is based upon the blood examination and the finding of the parasites in blood films after suitable staining. The question as to whether this parasite can be transmitted to healthy cattle by blood inoculation is a disputed one. It has been said to have been transmitted by this means in France, but in Egypt, owing to the impossibility of obtaining "clean" native cattle, or if imported ones be used, of preventing accidental infection, it has not been possible to obtain satisfactory proof.

East Coast Fever.

Although the infection with *Theileria parva* does not occur in native cattle, it has been reported in those coming from the Sudan. The appearance of the parasite in blood films is very similar to that of *Theileria mutans* and in the case of a severe infection of the latter, the condition may easily be mistaken for East Coast Fever. Owing to the fact that the death rate of cattle said to have been infected with this disease has always been very low, it is more than possible that many of the supposed cases have really been due to a *Theileria mutans* infection. Since it has been shown by Mason and Doyle that Koch's blue bodies (plasmaspheres) may be present in acute attacks of "Egyptian fever," this characteristic feature which at one time was considered as diagnostic of East Coast fever now falls to the ground.

Anaplasmosis.

A few cases of *Anaplasma centrale* and *Anaplasma marginale* have from time to time been noted, but this condition cannot be said to be in any way widespread.

Coccidiosis.

The occurrence of what is termed "red dysentery" due to protozoal parasites, *Eimeria zurni* and *Eimeria faurei* has long been recognised in Egypt. Losses from this disease have not been very great, but it is of considerable importance from a diagnostic standpoint, owing to the similarity of its clinical symptoms with those of cattle plague.

Trypanosomiasis.

Trypanosomes, although common in Egyptian camels, have only on rare occasions been demonstrated in native cattle. The exact species present is in some doubt. Trypanosomes resembling *Trypanosoma pecorum* have been found in the blood of Sudanese cattle imported into the country.

MISCELLANEOUS.

Of diseases of minor importance which do not call for legislative interference may be mentioned Actinomycosis and Actinobacillosis, both of which are well known ; vaccinia (cow pox), malignant catarrhal fever and the so-called " Farcy " of the ox due to a streptothrix. Tetanus following operation wounds has on several occasions been described in cattle.

Jöhne's Disease, Black Quarter and Contagious Abortion have not as yet received official recognition, and it is doubtful if they are present in the country or not.

PARASITIC CONDITIONS.

The parasites found in cattle are legion, but only a few of the more important and interesting can be mentioned here.

One of the commonest parasitic infections is that of *Echinococcosis*, the cysts occurring chiefly in the lungs and liver. The presence of the cystic form of *Tænia saginata* (*Cysticercus bovis*) in the muscles of young cattle, as a rule in the masseters, pterygoids, heart muscle, diaphragm and occasionally in other positions is of considerable importance from the meat inspector's point of view.

Liver flukes cause considerable losses in some cases, *Fasciola hepatica* and *Dichrocoelium lanceolatum* being the most common.

Bilharziosis due to *Schistosoma bovis* has been encountered both in Egyptian and Sudanese cattle.

ŒSOPHAGOSTOMIASIS.—*Œsophagostomum radiatum* present in the cæcum and large intestines has in some cases been responsible for numerous deaths, while *Œsophagostomum inflatum* has been demonstrated in Sudanese cattle, although it is apparently harmless.

ONCHOCERCIASIS.—Mason reports that *Onchocerca armillata* has been found in about 80 per cent. of both Egyptian and Sudanese cattle and that it also occurs in buffaloes. It inhabits the aorta and its immediate branches producing loss of elasticity of the walls by the formation of calcareous plates leading on to aneurisms. Another form, *Onchocerca gutturosa*, has been described in the cervical ligament of both Egyptian and Sudanese cattle, although it produces no harmful results.

SKIN PARASITES.—Of skin parasites may be mentioned the usual forms of mange generally met with in the ox, including the demodectic variety. Ticks, some varieties of which have been mentioned under piroplasmosis, are exceptionally numerous and responsible for much loss. Lice, both *Hæmatopinus* and *Trichodectes* are very plentiful, a species of the former being found on nearly every buffalo in the country.

It is hoped the above rough sketch of the ailments to which cattle are liable in Egypt may prove of interest to the casual reader, but to any one requiring further information, reference must be made to the published reports which used to be issued annually by the Director of the Veterinary Service, Cairo.

PHTHIRIASIS OF THE MOUSE: *HEMATOPINUS MURIS*, WITH OBSERVATIONS ON TREATMENT BY SALICYLIDENE COMPOUNDS.

By ARTHUR COMPTON, M.D., D.Sc.,
Surgical Unit, St. Mary's Hospital Medical School, W.2.

The author is not aware of any description of the mouse louse. No mention, for instance, is made of this parasite in the exhaustive treatise on the parasites and parasitic diseases of the domesticated animals by Neumann and MacQueen*. Yet, when lice infection breaks out among mice the condition is of serious import both to the breeder and to the laboratory investigator, working with such stock; for the infection, unless controlled, spreads rapidly from animal to animal with disastrous results.

It is hoped that the present account of the parasite, with the condition in mice to which it gives rise, together with the methods of destruction of the parasite which the author has found most serviceable, may prove of interest and help to others.

I.—Phthiriasis in the Mouse.

At first sight it appears to be the debilitated animals of the stock which become infected. So much is this so that the impression is easily gained that debility on the part of an animal is the cause of its having become louse infected. But further observation will soon correct this impression, for no sooner have the debilitated animals succumbed than fresh animals will be seen to become ill and they in turn die.

Mice infected with lice present a characteristic clinical picture: they become lethargic, they have no desire for food, their coats are dry and ruffled, evidence of scratching in the nature of excoriations about the ears and the back of the neck may be present, they are cold, symptoms of xerophthalmia may be present, their tails are blanched, they huddle away in a corner of their cages and altogether they look miserable, until eventually death occurs.

* Neumann and MacQueen. "A Treatise on the Parasites and Parasitic Diseases of the Domesticated Animals." London, 1905, pp. 897.

XIIM

Unless the investigator, or the breeder, is familiar with the condition, it may escape him; and his diagnosis in the first instance may well be that of some vitamin deficiency disease. But he becomes aware of the fact that his mice are infected with lice if perchance he takes one of them from its cage and holds it near a fire to warm it. Suddenly the entire covering of the animal becomes a seething mass of life, the lice have left their hiding places and come forth to the surface and to view under the influence of the warmth.

II.—Hæmatopinus muris.

The accompanying micro-photographs show the lice met with as seen with the $\frac{2}{3}$ objective and a No. 4 eye-piece. The larger form on the right (Fig. 2) is the female insect, the smaller on the left the male (Fig. 1).

The head is short, is as broad as long, and is angular in front; it carries two antennæ, which are implanted on lateral protuberances. The third and fourth articles of the antennæ are alike. The thorax is again short, and like the head, as broad as long. The abdomen

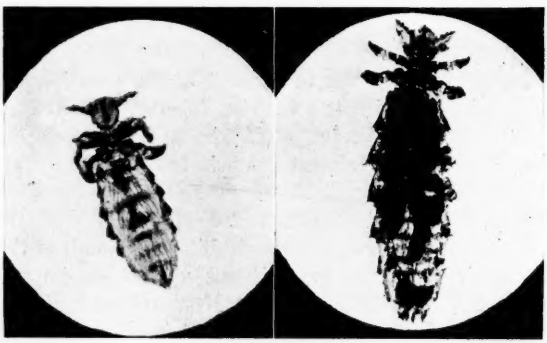

Fig. 1. Fig. 2.

is an elongated oval, with sinuous borders and two projecting appendages in the angle between the various segments; it is sparsely covered over with short bristles about 8μ long. The general colour of the insect is a pale, straw-yellow, the abdomen being irregularly spotted with ferruginous spots, mostly noticeable at the sides. The length of the female is about 1·5 mm., and the male 1·1 mm.

In the accompanying photograph of the female, the irregular dark area seen in the right of the abdominal cavity represents blood which the insect has recently sucked from its host, and under the microscope this is seen, through the transparent abdominal wall, to vary in tint

from bright red to chocolate, depending on how recent the meal and the stage of digestion which it has undergone. Thus it may easily be appreciated why the mice become debilitated and succumb to infection with lice ; they die from anæmia, or from some intercurrent infection (pulmonary or intestinal) for which the anæmia has prepared the way.

III.—Methods of Lice Destruction in Mice.

Many of the remedies indicated for lice destruction in larger animals, such as camphorated oil, mercury applications, balsam of peru, being of impracticable application in the case of mice, something else had to be found. Tincture of iodine was first tried, but was found to be ineffective. Then painting with alcoholic solutions of a limited number of antiseptics was tried, and while pursuing this line of enquiry it occurred to the author to test for insecticide properties two members of the salicylidene group of phototrophic substances : salicylidene m-toluidine and salicylidene p-amino benzoic acid.† Following painting with a one per cent. alcoholic solution of the former substance the mice were observed next day to be remarkably lively and clean. This compound, however, being very soluble in petrol it was decided to try the effect of using a petrol solution, petrol itself being known to possess important insecticide properties and in addition the advantage over alcohol of being more quickly evaporated from the body of the mouse. In this form, working with a one per cent. solution, a preparation of undoubted efficacy for the treatment of lice infection was obtained. The second compound being less soluble, a saturated solution (about 1 per cent.), made in a mixture of equal parts of alcohol and petrol, was used. It yielded equally good, or even better, results.

The treatment can very simply be carried out as follows :— With a small cotton-wool swab, affixed on the end of a metal rod and moistened with the solution, the affected animals are painted daily, as occasion demands, over the sites where the lice are observed to lodge : the forehead, around the eyes, the back of the neck especially behind the ears, and as frequently as not over the entire body. The mice support this treatment apparently quite well, the alcohol and the petrol evaporating off very quickly, leaving their coats slightly yellow stained by the phototrophic substances.

† These substances were discovered by Senier and Shepheard (*Jour. Chem. Soc. Trans.*, 54, 1909, p. 443 and p. 1945). I was led to their employment because of a chance observation in regard to the antiseptic properties of one of them : salicylidene m-toluidine. A few drops of an alcoholic solution incorporated in a tube of melted agar renders the medium quite unsuitable for microbial development.

NOTES FROM THE DISSECTING ROOM.

A. W. WHITEHOUSE, M.A. (Oxon), M.R.C.V.S.,
Principal, and Professor of Anatomy, in the Veterinary College, Glasgow.

SOME of the following notes are of little interest except to anatomists, and are forwarded chiefly for the purpose of having them recorded. Others have practical applications in surgery, etc. Others again propound puzzles still awaiting solution.

We are doing pretty thorough regional dissections of the Horse, Ox, Sheep, Pig and Dog, the dissections being carried as closely parallel to each other as the differences in the species permit, and we find that text-book descriptions, particularly of the sheep and pig, are extremely sketchy. Students of Classes A and B are responsible primarily for a number of the observations below, and I have tried to give them individual credit for their work.

MEDIAL ASPECT OF THIGH AND LEG.

HORSE. *Action of Adductor Muscle.*—Of course it adducts. In addition Chauveau states that it rotates the femur outwards. Sisson inwards. As most of its insertion is to the back of the femur, Chauveau is right ; the rotation is outward.

Course of Saphenous Artery.—This small vessel leaves the saphenous vein a little below the stifle and accompanies the recurrent tibial vein to the back of the inner aspect of the leg.

OX. Mr. P. Leckie (Class B) observes :—

Pectineus Muscle.—Its long insertion is supplied by the saphenous nerve, not the obturator. This may have some bearing on *post-partum* paralysis.

SHEEP. Mr. H. G. Stewart (Class B) observes :—

Saphenous Artery is extremely small, soon lost like that of horse, and thus in strong contrast to those of ox, pig and dog.

Sartorius Muscle arises from two heads in the iliac region, between which pass the femoral vessels and saphenous nerve. It has a single delicate insertion on the medial aspect of the patella.

Femoral Artery.—The trunk for the external pudic and deep femoral is as large as the main artery. The anterior femoral and lateral circumflex come off by a common but smaller trunk.

PIG. Mr. J. M. Ingram observes :—

Pectineus Muscle.—The nerve is a branch of the femoral.

EXTERNAL GENITALS.

HORSE. *Circulation of Penis.*—Mr. J. M. McDonald (Class B) observes :—

In bull, ram, boar and dog, it is clear that both blood supply and drainage travel exclusively via the ischial arch and belong to the internal pudic vessels. In the horse the anterior dorsal artery

of the penis is a branch of the external pudic, and the arteria profunda penis is a branch of the obturator; these vessels ramify freely in the loose tissue surrounding the tunica albuginea of the penis, but it is hard to find vessels penetrating that coat, and it is Mr. McDonald's impression that he failed to find any. In the same way there is an immense plexus of veins on the lateral and dorsal aspects of the tunica albuginea draining chiefly into the external pudic veins, but also into the obturator veins. Certainly very few of these, and to our observation probably none arise from radicles within the white coat.

So that it is possible that the horse really conforms to the type of the others: all the essential drainage and supply of the erectile tissue travelling via the ischial arch and the internal pudic vessels.

Mr. McDonald intends to make further observations on this point, and I would be glad if some other anatomists would take it up.

External Pudic Vein.—As to the course of this vein there is a conflict in the texts.

My own observation, both in Colorado and in Glasgow, fully bear out Sisson's description, which is as follows (page 696) :—" The External Pudic Vein arises chiefly from a rich plexus of large veins situated above and along the sides of the penis and prepuce in the male, the mammary glands in the female. It passes through a foramen in the anterior part of the tendon of origin of the gracilis and runs outward behind the pectineus to unite with the deep femoral vein. The right and left veins are connected by a large transverse anastomotic branch which lies in the subpubic groove, and each has a large connection with the obturator vein. . . . A small vein may accompany the external pudic artery in the inguinal canal."

In my experience this small vein is not common, but one or more lymph vessels containing dark material are pretty constant.

The English translation of Chauveau (p. 709) has two errors, one purely careless, the other due to misunderstanding of the original, but the French text (vol. II, p. 413) is quite correct.

I may remark that the English version is a dangerous thing in the hands of the young, unless they are also given the original from which to correct the innumerable mistranslations.

Montané and Bourdelle, Cheval (p. 833) have an adequate description.

McFadyean Horse is correct though obscure for the male, incorrect for the female.

P. 290. " A rich plexus of veins exists in and around the scrotum. This plexus is drained by a comparatively small vein that accompanie

XUM

the external pudic artery, and by a larger vessel which penetrates the gracilis to empty itself into the femoral vein."

P. 295. "The arteries and veins of the (mammary) glands are branches of the external pudic vessels."

P. 300. "The external pudic vein is proportionately smaller than the artery, which it accompanies."

Bradley, in his text, does not apparently recognise the large vein which penetrates the gracilis muscle at all.

Thorax and abdomen (p. 69). "Associated with the mammary glands are . . . two main veins . . . cranial and caudal—on each side of the body. . . . They both join the external pudendal vein which enters the abdomen by the inguinal canal."

Thorax and abdomen (p. 77). "V. Pudenda Externa. The region of the prepuce and penis contains a large number of veins between which are frequent anastomoses. These, by their union, produce the cranial and caudal radicles of the external pudendal vein, which is a companion of the artery of the same name."

However, in his "Limbs" (p. 103), he shows the correct course of the vein in an illustration.

Surgically, the point is without much importance in the male, as any operation on the upper part of the penis and prepuce is sure to be so bloody that extensive ligation or packing is necessary.

In the female, however, an operator removing one half of the mammary gland and relying on either of the British anatomists, would expect a practically bloodless operation after ligating the vessels coming from the inguinal canal, and would be badly surprised when, as the next step in his operation he proceeded to cut the very large external pudic vein that goes through the foramen in the gracilis.

RAM. Mr. G. Slavin (Class A) and Mr. T. L. May (Class A) observe:—

Retractor Muscle of Prepuce.—There are two narrow strips of involuntary (gray) muscle originating in the fascia just in front of the spermatic cord and running along in the substance of the prepuce to be inserted in the deep face of the skin at the orifice.

In another ram I did not observe these muscles.

Perineal Muscle.—Observed by myself and confirmed in another case by Messrs. Slavin and May.

At the termination of the Ischio-cavernosus muscle two slips run forward about two inches on the ventral face of the penis. They form a sort of sling for the retractores penis, which run dorsal to them.

CONTENTS OF LYMPH VESSELS.

I mentioned above the fact that one or more lymphatic vessels containing a dark substance might accompany the external pudic artery in the inguinal canal. This dark substance is fairly common

in lymphatic vessels of the horse over many parts of the body: and I have sometimes seen it in the ox. Our dissecting room subjects are bled as thoroughly as possible and injected with 50 per cent. formalin (=20 per cent. formaldehyde) under considerable pressure, but I have seen the same condition at autopsies, especially in the neighbourhood of joints. The substance in the lymph-vessels is dark and pasty, and is indistinguishable from clotted venous blood in gross appearance. Has anyone else noticed it? If so, does anyone know what it is? And if it is blood, how has it reached the lymph-vessels?

Clinical Articles

AN EQUINE LITHOPEDION.

By F. A. E. CREW, M.D., D.Sc., Ph.D.,
Animal Breeding Research Department, University of Edinburgh.

ENFOLDED in, but unattached to, the placenta of a normal foal there was delivered naturally a rounded hollow sphere, 6·3 cms. in diameter, and with a calcareous wall at most points about 1 mm. thick. Its external surface bore markings reminiscent of the chorionic villæ of the normal diffuse equine placenta. When the sphere was bisected, it was found that its only content was a much smaller heavily calcareous rounded body, 12 mm. in its longest diameter, and firmly adherent to the wall. This body was also hollow and was empty. The rest of the inner surface of the wall of the larger sphere was plentifully scored with lines of what were probably at one time branching blood vessels and was very irregular. Sections of all parts

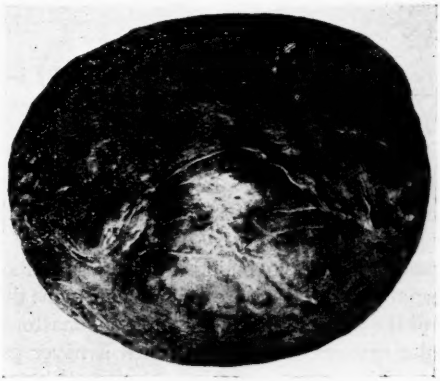

FIG. 1. The External Surface of the Lithopedion.

failed to reveal any significant structure; fibrous tissue heavily impregnated with inorganic salts alone was identified. However, it is at least reasonable to regard this sphere and its contents as a lithopedion, a dead fœtus that has undergone a certain degree of resorption, and has become, through course of time, heavily impregnated with lime salts, the larger sphere being the remains of the embryonic membranes, the smaller the embryo itself. If this is so, then it follows that the death of this embryo occurred very early during the course of pregnancy, for a 28 days' horse embryo measures about 12 mm. (Ewart).

If this specimen is regarded as a dead and calcified embryo, it is necessary to enquire whether it was a twin to the foal that was born alive or whether it was the result of an earlier conception which had been retained *in utero* to be extruded at the time of the parturition of another foal subsequently conceived. The facts that twinning is rare in horses; that this mass was heavily impregnated with lime salts, a process that demands a certain amount of time; that it was nowhere attached to the placenta of the foal which was born alive;

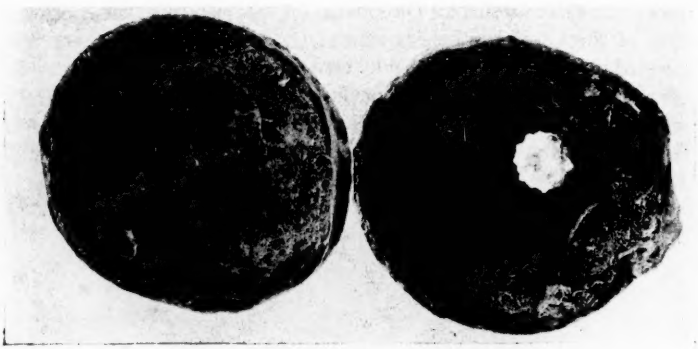

FIG. 2. The Internal Surface.

and that there was no regionalisation in its surface markings incline one to the opinion that this was a fœtus corresponding to a previous pregnancy that had been extruded from the presently non-pregnant uterine horn.

In those species in which twinning is not unusual, the early death of one fœtus is not rare. In the case of uniovular twins there is always a certain area of the placenta in which there is an anastomosis between the two vascular systems, a condition which is never present in the fused placentæ of binovular twins. In such cases it is not uncommon to find that, as a result of the fact that the heart of one fœtus may

become considerably stronger than that of the other, a gradually increasing area of the communicating portion of the placenta becomes monopolised by the former, so that the heart of the one rapidly increases in size and functional capacity whilst that of the other, receiving less and less blood, eventually atrophies. Such circumstances lead to the development of *acardius amorphus* in the case of the starved twin and to cardiac and renal hypertrophy in the other, which therefore may exhibit well marked hydramnios. In the case of binovular twins one fœtus may die at an early period and be expelled, but more commonly it is retained until the end of the pregnancy, and if in the same horn of the uterus as the living fœtus becoming compressed between the uterine wall and the membranes of the living fœtus, becoming flattened to form a *fœtus compressus* or becoming mummified, a *fœtus papyraceus*. If the dead fœtus is retained *in utero* for a long time, and in the human subject cases are recorded in which such a fœtus has been retained for as long as fifty years, it commonly becomes converted, through the deposition of lime salts upon it, into a lithopedion.

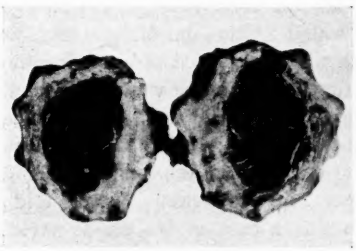

FIG. 3. The Smaller Body Bisected (×2).

AN OBSCURE CASE OF LAMENESS.

BY GEORGE HOBSON, M.R.C.V.S.,
Waterford.

ON January 10th, 1925, I was asked to look at a thoroughbred colt, four years old, which was lame. The history of this animal was that when it was a two-year-old it got " cast " in the stall, and on being released was found to be very lame. The owner had a V.S. staying with him at the time, who examined it and diagnosed a bruised sole on the near hind, and ordered complete rest and bran poultices. This was carried out, but still the colt was lame, and so the owner turned him out on grass. After some months he went sound, and the owner took him in, put shoes on him, and began to do a little work with him. A week later he again went lame and remained so, until I was asked to see him.

I examined him, but could not satisfy myself as to the seat of lameness, the only thing noticeable being that when one ran one's

XUM

finger along the longissimus Dorsi muscle on the near side, the animal just " gave " a little at the region of the loins. However, I had a suspicion, on account of the history, of a fractured navicular bone, and so I decided to inject cocaine into the plantar nerves on the near hind. I succeeded in putting it in the outside one, but couldn't get near him to do the inside one. However, on being trotted he went remarkably better and was almost sound.

I advised the owner to blister the pastern and apply a charge to the affected part of the loins, and rest the animal completely for six weeks. After four weeks I saw the animal and he was then going sound, and he was still going sound at the end of six weeks, when he was shod and put into work which consisted of about two hours in the ring every day, and after some time he was ridden and remained sound. However, he still " gave a little " in the region of the loins as before. During the very hot weather in June last he was not exercised for three days, and when he was pulled out he was again lame, so the owner turned him out again. I then told the owner that, in my opinion, it was a case of fractured navicular bone, and that I could do nothing further for him. I more or less lost sight of him then for a couple of months, but when next I saw the owner he was riding the colt, which was quite sound. On being asked what he did with him, he said that a local medical practitioner who keeps a few horses advised him to " cup " the animal. This consists in getting a tumbler, filling it with boiling water, emptying it and inverting it over the part of the loins where the animal " gave away " from the touch. This caused a large blister and a week later the animal was going quite sound and has been hunted during the last season.

SOME OBSCURE CASES OF POISONING IN CATTLE (SUSPECTED HYDROCYANIC ACID IN LINSEED CAKE).

By ANDREW BARR, M.R.C.V.S.,
Watford.

In the middle of November last I was called to a farm where two heifers had died suddenly and another was very ill. Satisfying myself that it was not anthrax I then proceeded to make a *post-mortem* examination and found marked gastroenteritis and congestion of the lungs. Suspecting poison, I carefully searched the contents of the stomach and made close enquiry about the food and drinking water. The heifers were not being turned out and only having hay and 2 lbs. per head per day of linseed cake.

I advised an analysis of the contents of the stomach and sample of the linseed cake. This was carried out by Professor Clough, D.Sc., of the Royal Veterinary College. He reported an abnormal quantity of hydrocyanic acid in the cake and in his opinion the most probable cause of the trouble.

The one that was ailing showed symptoms of gastric trouble, being slightly hoven up; also to have some congestion of the lungs and a cough. She was treated accordingly, but died after a few days. Another also died. Neither of which I had an opportunity of making a *post-mortem* examination on. The fourth I did not see at all.

Ten days later I was called to another farm about 20 miles apart from the above mentioned, where one heifer had died suddenly and another seriously ill. On my arrival another was ailing. Having separated the ailing ones and given treatment, I then made a *post-mortem* examination of the dead one. There was marked gastro enteritis. Suspecting poison, I made a careful examination of the stomach and bowel contents, also enquired into the feeding, drinking water, etc. Being unable to discover a likely cause, I suggested an analysis of the stomach and bowel contents, also a sample of the linseed cake. This was carried out by Professor Clough, who again reported an abnormal quantity of hydrocyanic acid and this to be the most probable cause of the trouble. Next morning the two that were ailing had died, and I made a *post-mortem* examination, again finding marked gastro enteritis and hæmorrhage, congestion of the lungs and kidneys.

A fourth heifer was now ailing, which died the following day, and the *post-mortem* lesions were similar to the other two. Two others which were slightly ailing recovered (there were six in all in the loose box).

What seemed so peculiar in both instances and made one rather sceptical as to whether or not it was due to hydrocyanic acid was that the trouble was confined to one pen of heifers on each farm, although many other animals of about the same age were being fed on the same cake and the stockmen were certain they were not averaging more than 2 to 3 lbs. per head per day.

CYSTIC DEGENERATION OF THE UTERINE WALLS.

J. R. BARKER, M.R.C.V.S., D.V.H., Hereford.

THE following came under observation through the good offices of Mr. Mathias, M.R.C.V.S., of Letterston, the owner of the cow, which was a pedigree dairy shorthorn.

This cow, recently purchased, was examined as to the cause of sterility of long standing on January 18th, 1926.

Enquiry into her breeding record revealed the following facts. She had produced three live calves at separate pregnancies previous to 1923. In December 1922 she aborted twins at 266 days. No history was forthcoming that she had retained the placenta, but there had been a persistent discharge from the uterus ever since.

The cow had not been known to have been in œstrum since conception somewhere early in 1922.

A clinical examination was undertaken and the findings recorded. The vagina was elongated, and the floor just in front of the cervix contained a considerable quantity of light straw-coloured watery fluid.

V. — Vulva. R.U.—Right Uterus cut open
Va. — Vagina. L.O.—Left Ovary.
C. — Cervix. ⟶ unopened cysts.
L.U.—Left Uterus. ⟹ open & opened cysts.

The cervix was enlarged, but the canal was patent.

On introducing one's hand into the rectum palpation of the uterine horns was difficult owing to the elongated vagina.

Retraction of the cervix with uterine forceps brought the uterus into purview and a series of elevations and depressions like duck eggs and cricket balls could be easily distinguished in the wall of each horn.

Catheterization of the uterus proved easy so far as the passage of the cervical canal, but the catheter could not be made to enter far into either horn.

The first return flow brought back a watery fluid with a few cystic flukes.

A tentative diagnosis of a diseased condition of the wall of the uterus was made, and as prognosis was distinctly unfavourable the animal was slaughtered.

The cow was, and had been, in perfect health and

condition, and Mr. Mathias, who made the *post-mortem* examination, reported no evidence of any disease in any of the other organs.

The accompanying plate is a photograph taken recently of the preserved specimen. The series of enlargements proved to be large cysts embedded in the uterine wall some two or three being open to the lumen of the uterus, hence the watery discharge through the cervix into the vagina.

THE LEGEND OF A GLASS EYE.

By HERBERT BUCKINGHAM, M.R.C.V.S.,
Norwich.

Telephone call, "Come and see my new dog's eye." I went at once and was invited into a room divided into dining and drawing rooms by folding doors. I was in the former part of it and owner and dog came in. I looked at the dog's eye.

The lady, ancient, majestic and truthful, told me she was sure the dog's eye was normal when it came yesterday and when it was left at night in the drawing room: that the housemaid swept that room out. The maid said the sweepings were still in the dustpan. I asked her to bring it, and a newspaper. She did so. I then emptied the contents of dustpan on to the newspaper and a glass eye was revealed.

Needless to say, the orbit was minus its eyeball and had been healed a long time. I advised the lady to send the dog back to the seller. I could not see much sense in the trick, but—there are "all sorts" in the population of the world.

A CANNIBAL CAT.

By HERBERT BUCKINGHAM, M.R.C.V.S.,
Norwich.

I have a "hobby," viz., curing and dressing cats' and dogs' skins. I have a cat about nine months old. This cat is always at my heels when I trim the fat, etc., from the skins, and the cat will eat the fat as it falls to the ground, whether it comes off a cat's or a dog's skin.

He will often eat more than is good for him and be "off colour" for two days.

Until now I should have said that you could not induce a cat to eat any product from the carcase of a cat or dog.

XUM

TORSION OF THE SMALL INTESTINE IN A DOG.

By GUY SUTTON, F.R.C.V.S.,

Kensington, London.

COMPLETE twist of the mesentery and small intestine as a cause of death in the dog is infrequent, and the following account is of interest as its record may one day be of assistance in supporting the statement of the veterinary surgeon to an incredulous and perhaps litigatious client should a similar occurrence happen whilst a patient was in his hospital.

An Alsatian puppy, about four months old, was brought for advice some ten days ago, suffering apparently from a mild attack of distemper. The owner arranged to keep it in one room at home and report as to its progress. The report was completely satisfactory. Instructions were given to "carry on" and bring up for inspection in a few days. This was done. The owner remarked, "there is no bad symptom and the puppy is doing excellently, but has not yet recovered her spirits and is still quiet." The dog was examined and bore out the owner's statement. The temperature was 101·8. It moved freely and showed no evidence of pain when handled and lifted upon the table. It had not vomited, had eaten well and there was no diarrhœa. On the following morning it appeared to be well, but at noon was found to be dead. The body was examined about four hours after death and the small intestine was found to be completely twisted upon itself. The abdomen contained about six ounces of blood-stained fluid. The whole of the colon was distended with gas and purple in colour. Semi-solid fæces were in the rectum, and though the stomach was empty the duodenum contained some remains of a meal. It is extraordinary that nothing unusual was noticed before death.

A NOTE ON FOLLICULAR MANGE.

By R. C. G. HANCOCK, B.Sc., M.R.C.V.S.,

Beaconsfield.

THE article by Major F. Chambers in the January number of the Journal has proved extremely interesting to me, as it bears out my own observations to a great extent.

Undoubtedly a large number of cases of eczematoid eruptions in dogs can be shown to be associated with a heavy infestation of the skin follicles of affected areas by the demodex. At moulting time

when the skin is hyperæmic and scratching almost a dispensation of Nature for getting rid of the old coat, dogs, especially of the coarser haired breeds, are brought for treatment for "Moulting Eczema." Large quantities of demodex can usually be demonstrated in these cases. Again, after distemper, where the greenish pustular rash has been severe, Follicular Mange, so called, is a possible sequel. Distemper sequelæ have a way of hunting in groups, and 1925 was particularly rich in cases of pustular, deep-seated Follicular Mange following upon distemper, in my own part of the world. This, I think, would account for Mr. Chambers' observation that Follicular Mange is on the increase of late.

I am inclined to think that the cart is put before the horse in our consideration of this disease. We know that the demodex is an almost universal resident upon the skins of dogs. Degrees of individual cleanliness, and the individual palatability of the skin secretions to the demodex can surely explain his numerical variability in cases ranging between health and disease. Observation shows us that at moulting time the skin excretions become more palatable to the demodex. Fortunately, nature usually restores the balance, and we must recognise that quite a number of cases deserving of the title Follicular Mange can undergo natural cure.

In the case of distemper or any other disease that may impair the body defences over a long period, the skin may lose its resistance to pus organisms and a deep-seated pyogenic sycosis results. This pus is by way of being nectar to the demodex, and he rapidly takes possession of his purulent paradise.

I had a severe case brought to me for treatment in October, 1925, in an Airedale dog, two years old. To outward appearance the dog had Follicular Mange. The pus on culture yielded Staph. Albus, and Strept. Brevis. On no part of the body could I find the demodex in the abundant pustules, except round the jaws and head. Five weeks later they appeared in the pus on the left fore and hind leg. This is interesting as the dog was accustomed to lie in his box with his chin resting on these two limbs. Later on I was able to find demodex in other parts of the body as well.

I suggest that Follicular Mange is primarily an invasion of the skin by pus organisms, and that the demodex is a secondary invader. I have more than a suspicion that the disease is in the nature of a symbiosis, that is that each member is of value in the persistence of the other. I believe that what should be successful methods of defeating the pus side of the partnership are defeated by the aid of the demodex. And to attempt to destroy the demodex without

attempting to affect his environment is only too well known to us and our forefathers as a hopeless task.

I am not certain as to whether it is, *per se*, a contagious disease or not. I have two severe cases in my kennels at the moment that had shared the same sleeping box for months. As it happens I was called to remove a bone from the throat of one of them two months ago, and at the time I remarked to the owner that one of them looked as though it had recently got over distemper. Like so many cases of mild distemper the only treatment had been vermifuge, and I rather think in this case, as in several others I have noticed, that both subjects have come under the primary influence of distemper, and so lost their resistance to the pus organisms. I have yet to meet an instance of transmission from one dog to another free from the primary taint of distemper.

As to treatment, I have until recently relied on 10 per cent. sulphuric acid in methylated spirit. This is scrubbed into areas about the size of a cheeseplate each day with a nail brush until all the affected areas have been covered. Absence of pus the following day on the treated area shows that penetration has been sufficient, and the necessity for a further " touch up " with acid shows itself by the dog scratching itself, and pus again oozing when the skin is squeezed. I have modified this treatment in three very bad cases at present in my kennels by starting off with the acid, and then going on to mercurophen. In other words my mild blister is sulphuric rather than Mr. Chambers' mercurial blister, for as mercurial treatment is to follow, I think it is safer, and larger areas can be covered at a dressing.

I also give lemon juice by the mouth, and I believe with excellent results. In fact one may be said to be employing an acid treatment, which compares most favourably with the state of affairs when liq. potassæ and other alkalies are used to attack the eruption.

In severe cases vaccine treatment should not be started until the temperature has been normal for several days. I then use Park Davis' Follicular Vaccine, Bio. 820. At least double the recommended dose may be given at first, and then treble doses instead of the suggested double doses at three-day intervals.

I have yet to try X-rays. The wonderful effect in human sycosis is within my own experience, and I am anxious for an opportunity of seeing its results.

In any event, I am satisfied that cases of such severity as I was taught to regard, and have come after my own experiences, to regard as hopeless, are capable of cure. Great patience and thoroughness

over weeks is of vital importance to success, and without these individual factors failure is certain. In any case, one can never hope to fill the ledger with this disease. The time and skill expended will rarely balance the sentimental, let alone the economic, value of the patient to the owner.

Abstracts of Current Literature

The Mineral Content of Pastures.—Report on an investigation carried out under the direction of W. E. Elliot, J. B. Orr and T. B. Wood at the Rowett Research Institute, Aberdeen, and the Nutrition Research Institute, Cambridge.—Reprinted from *The Scottish Journal of Agriculture*, Vol. 8, No. 4, Oct., 1925, by permission of the Controller of H.M. Stationery Office.

THIS investigation included two main lines of work, namely, analysis of samples of pasture from different areas (1) to determine the percentage composition of the mineral matter, and also a series of samples from some areas collected at three-weekly intervals from May to September to determine the seasonal variation in the percentage composition, and (2) feeding experiments with sheep to determine the influence of certain differences in the mineral content of the diet on rate of growth and health.

Three hundred and thirty-eight samples of pasture were analysed from Scotland, England, Wales, the Falkland Islands and Romney Marsh, and samples from some areas to show seasonal variations. The feeding experiments were carried out by Captain Elliot, at Lanark. The conclusions arrived at were :—

1. Marked differences are liable to occur in the mineral content of uncultivated pastures grown in different localities.

2. Sheep in grazing choose pastures whose mineral content most closely approximates to that of good cultivated pasture.

3. In most of the pastures collected from the West Highlands and the Falkland Islands the mineral element most deficient was calcium.

4. Young sheep on a diet deficient in calcium fail to grow at the maximum rate. The addition of calcium salts or cod liver oil to such a diet is accompanied by an increased rate of growth and an improved condition of nutrition for the animals.

Monbet, M.—Veterinary Major.—Urethral Calculus in a Horse and Subsequent Facial Anasarca.—*Revue Vétérinaire*, No. 6, June, 1925.

ON April 5th, 1923, a four-year-old horse " Tunisian " was brought

to the infirmary for treatment with the following statements. He had refused food, shown much unrest in his stall, had been pawing and crouching.

Set free in a large loose box he went round in a circle, grazing the wall, nose turned to the croup, rubbing the base of the tail as if there was much itching, breaking wind, then walking about, but coming to the centre of the box he scraped the litter vigorously and laid down heavily on the ground. He got up quickly and recommenced the same cycle.

The conjunctiva was injected and infiltrated and most remarkable a pronounced œdema had invaded the face ; the masseter regions were so œdematous that the zygomatic ridges showed as deep depressions.

The pulse was hard and quick, facial exploration was hindered by the œdema of the region, respiration was short, the ears and lateral aspects of the neck were covered with a cold sweat.

Disturbance was so great that we delayed rectal exploration and resorted to bleeding, chloral hydrate orally, and morphine and chloral hydrate intravenously.

Calmness ensuing we explored per rectum and found the digestive tract normal, but the bladder was fully distended and pressure on it produced agonising resentment ; the accessible left kidney was painful.

Not having urinated or attempted to do so, we diagnosed obstruction of the lower urethral passage.

The penis was extruded from time to time, but its methodical exploration gave a clue to the key of the mischief and to the method of giving relief. A calculus the size of a very large olive was lodged in the navicular fossa of the urethra.

Enucleation by simple taxis was painful and without result. With strong forceps the calculus was broken and a third of it drawn out in the jaws of the instrument, a stream of urine freed and brought away the remainder.

Some interesting conclusions may be drawn from this clinical.

(1) The suppression of the assumption of the fixed attitude for urinating is curious, seeing that it is quite to be expected in such a case ; perhaps he had assumed the attitude before our examination, and finding that by so doing he increased his pain he had abandoned all efforts at urinating.

(2) The symptoms which had their situation in the sacral region : itching, disturbances caused by traction on the tail may be explained by the sympathetic connections that the solar plexus establishes between the sacral region, the colon and the bladder.

(3) Anasarca of the face following urinary obstruction ought to draw attention in similar cases. According to the Widal theory chlorides in excess, finding the renal parenchyma barred, are thrown back by the blood into the tissues and attract liquid. There ensues a kind of defensive process by dilution to shelter the tissues from the irritant action of the chlorides.

Douville, Prof. Dr. (Lyon).—Diarrhœa of the Dog and Lactic Medication. —*Revue Vétérinaire*, March, 1925, p. 141.

DIARRHŒA of the dog arises from various causes; consequently, the proper application of therapeutics needs the determining of its cause. From this view point it is convenient, according to Douville, to classify the diarrhœas of the dog into three categories: (1) Diarrhœas which indicate true defensive reactions of the organism against intoxications, often of alimentary origin; (2) Diarrhœas symptomatic of a more general affection such as kidney and heart disease; (3) Diarrhœas due to primary inflammation of the intestinal mucosa. Diarrhœas of this last kind are specially amenable to lactic medication.

The part played by lactic acid introduced into the intestine appears quite complex; it does not appear to act as a microbicide for its antiseptic power is weak; but whilst strongly acidifying the intestinal contents it obstructs or hinders the multiplication of the microbes of putrefaction which only vegetate in alkaline media. In this way lactic acid opposes the elaboration of toxic products resulting from the metabolism of proteins under the influence of these microbes.

Lactic therapy has been achieved in a number of ways. The simplest consists in giving lactic acid in the form of potions or syrups of two per cent. strength. This gives good results in the enterites of pups on condition that it is given 30 minutes after suckling so as to avoid massive coagulation of the milk in the stomach and indigestion. Bacteriotherapy consisting in the use of lactic bacilli in the form of cultures in milk or dried cultures has a certain vogue in human medicine. It has been equally successful in veterinary medicine, but in animals its action is slow and it needs to be continued a long time. Further, the introduction of lactic ferments into the digestive tube must necessarily be accompanied by nutritive substances indispensable to the vegetation of these ferments. The most important is starch. The therapeutic action of the lactic acid on the starch should, however, take place in the intestine. This can be brought about by incorporating the lactic acid in an enveloping substance such as gluten or keratin. Experience has shown that the protective excipient produces no damage in its passage through the stomach and duodenum and it only commences to be soluble and to liberate lactic acid when it

XUM

reaches the intestine. Lactic acid thus prepared goes under the name of " Kerlactine," and is provided in the form of pills containing 10 centigrams of acid per unit. Ten to 20 pills per day may be given to young dogs in the intervals between meals. Adult animals may have 30 to 50 pills a day.

Spartz, L.—Lithiasis of the Pancreas in a Cow.—*Recueil de Méd. Vét.*, Oct. 30th, 1925.

From a pathological point of view the pancreas is perhaps least unobserved by veterinarians.

Its deep situation, which does not permit of exploration in the living animal, the absence of palpable clinical symptoms manifesting themselves as a result of the presence of morbific agents or of alterations in its structure or secretory functions are the cause of this.

Diabetes is very rare in our domestic animals ; the narrow relations which exist between this malady and affections of the pancreas have received much consideration in human medicine as a result of the discovery of insulin, but constitutional maladies attributable to disturbances in the physiological function of the pancreas have only a very restricted importance in veterinary practice.

Perhaps lithiasis is the only affection of the pancreas that one observes at the abattoir. At the slaughter house it is only submitted to naked eye examination for neoplasms, abscess, etc. It is only exceptionally that when the butcher incises the gland or the canal of Wirsung that attention is drawn to rounded colculi of a mother-of-pearl or yellow tint on the cut surface.

Of rounded or slightly ovoid form the size of a pin head, of stony consistence, generally very numerous pancreatic calculi may be seen in old cows having had various attacks of digestive trouble. These calculi are generally opposite each other in Wirsungs duct like beads of a chaplet, but they may be situated in the ramifications of the duct and even in the glandular cul-de-sacs or cystic dilatations. In one case at the Luxemburg abattoir, where M. Spartz is the municipal veterinary surgeon, 915 calculi were taken from the pancreas. The duct of Wirsung and the glandular tissue show no trace of inflammation. It seems that calculi occur as a result of abnormal mineral composition of the product of secretion rather than of an inflammation of the mucosa of the excretory canals. The hypothesis of a relation of cause and effect between abscess of the liver, calculus of the kidney and pancreatic lithiasis is not to be discarded.

In the subsequent discussion G. Petit stated that all lithiases were accompanied by catarrhal inflammation of the excretory canals which can be demonstrated microscopically.

These calculi seem to be brought about by an inflammation which is first of all of microbian origin and not as Spartz considers by an abnormal supply of a substance elaborated from mineral constituents.

Giovanoli, G.—Cases of Poisoning in Italian Literature.—*Schweiz Arch. f. Tierhlkde*, 1925, Vol. 67, pp. 254-256.

A cow received one litre of petroleum instead of wine. After half an hour symptoms of distress occurred (unrest, dyspnœa, bradycardia), fever, salivation, paraesthesia. After 10 hours the animal recovered. The milk had the mineral oil smell, which lasted for three days. As a remedy against cough a mule and a donkey received a handful of sulphur mixed with bran ; 14 hours afterwards they were found dead. At autopsy there was found a black colouration of the stomach and its contents (sulphide arising from formation of H_2S), and hæmorrhagic enteritis. The bodies were very stiff and death was probably from acute pain without spasms. Four cows suddenly showed dullness, loss of appetite, salivation, digestive disturbances (stomatitis, enteritis), agalactia. The symptoms were due to the use of grass that had been sprayed with sulphate of copper and lime water. With symptoms of great thirst and 6 to 10 hours after use of salt crusts 11 hens, 3 geese and 1 turkey died of salt poisoning. (We recently had a case where a lady lost over 50 fowls in a night that had received sweepings from a bakehouse floor, heavily impregnated with salt, in the mash.)

Instead of Glauber's salts 50 cows received 200 to 500 grammes of saltpetre. Thirty-four died with hypothermia, palpitation, trembling and increasing weakness after one to two hours. Anatomically there was acute inflammation of the whole of the digestive mucosa. With the apparently healthy flesh dogs were fed for five days without harm, the flesh only containing about 1 in 5,000 of saltpetre.

Meyer, J. B.—Fatal Haemorrhage following Torsion of the Uterus.—*Rev. Gén. Méd. Vét.*, Nov. 15th, 1925.

In a cow showing labour pains for four hours a diagnosis of a left torsion of the uterus was made. The os uteri admitted two fingers, but the torsion could not be reduced in the standing position. After having cast the animal and rolled it in different directions, there was a dilatation of the neck of the uterus and the hand could be passed into the womb. The fœtus was rapidly delivered and was a breech presentation. Returned to the shippon the cow laid down ; the extremities and skin became chilled ; the mucosæ became blanched and death occurred in a few moments. At the autopsy there was a great quantity of blood in the abdominal cavity. The right broad

ligament showed great hæmorrhagic infiltration, due to rupture of the median uterine artery. The womb itself was intact. The rupture of the artery had been brought about by pains and by the violent strain on the ligament following torsion of the uterus.

Klein, W., of Hoyerswerda.—The Treatment of Retention of the Afterbirth.—*Archiv. f. w. v prakt Trhlkude* 53, 1925.

THE author describes a method that he has adopted on 196 cows with retention of the cleansing and disease of the genitals. In most cases a complete emptying of the uterine cavity was aimed at and as a rule 3½ to 5 pints of boiled water at a temperature of 22 to 25° C. was repeatedly infused. To do this an india-rubber tube of red gum (with its wall two millimetres thick, a lumen of 10 millimetres, and a length of 160-170 centimetres) and a white enamel funnel were used. The fluid injected was only put in gradually and no air admitted. As a rule 10 to 15 litres (17 to 25 pints) of water sufficing. Medicinal charcoal was used in different forms, but chiefly as a broth (100 grammes of charcoal to 400 grammes of water) which, by means of the tube, was introduced as far as possible into the horn of the uterus. The manual removal of the secundines is aided and as a result of the charcoal may be accomplished within 24 hours.

In this way 196 cows were treated and 142 or 72.44 per cent. remained fruitful; 5 or 2.55 per cent. were slaughtered; as a result of leucorrhœa, etc., 22, or 11.22 per cent. remained sterile. No after examination following the treatment was made in 27 cows.

Zapfe.—Coccidiosis in the Dog.—*D.T.W.*, July 19th, 1924.

COCCIDIOSIS in the dog caused by *Isospora bigemina* is found chiefly in young dogs; the affection only rarely attacks old dogs. In benign attacks the bits of mucus enclosing the oocysts generally pass unperceived. If infection is heavy there is a catarrhal enteritis and sometimes bloody stools. In laboratory infection the spores can be found on the 11th day after partaking of infected food; they are plentiful on the 16th day and gradually disappear up to the 20th day. Complete cure with total disappearance of the spores is the rule, but cases of death may occur as a result of secondary infections and general weakness from profuse diarrhœa.

The number of oocysts passed in the excrement is an index of the gravity of the malady. Autopsy shows catarrhal, serous, or desquamitive enteritis, extending to the small intestine up to 20 centimetres from the cæcum. The parasites are lodged in the epithelial protoplasm notably at the villous points. For diagnosis one can

use successfully injections of physiological serum ; the mucus flocculi thrown out by the injections contain many oocysts and even merozoites. If the excrements are hard, search for the oocysts is not easy.

Moulin.—Contribution to the Study of Acute Insular Necrotic Hepatitis in the Dog.—Thesis for the Veterinary Doctorate, Lyons, 1925.—*R. G. de Méd. Vét.*, May 15th, 1925.

The author has collected three observations of the lesions described by Ball and Lombard under the name of acute insular necrotic hepatitis. All the observations have been made on the dead subject. The liver of the dog, yellowish brown, shows pale yellow islets, tinder-like, and of irregular contour, measuring only a few millimetres up to a centimetre in their largest diameter. The lesions are superficial ; they are never over two millimetres in thickness. These lesions correspond to necrotic islets involving several adjacent hepatic lobules. The extension of the lesion seems to occur centrifugally around a primary infectious focus, at the level of which the alterations are most marked.

The lesions have been found in dogs dying of acute broncho-pneumonia, hæmorrhagic metritis and Brights disease. These observations are the only ones existing in veterinary literature.

Bacteriophagy.—*North American Veterinarian*, February, 1926.

THE word " bacteriophagy " is a recent addition to the medical vocabulary. It is probably less than five years old and conceives a new theory of immunity. The bacteriophage is supposed to be a living virus—a filterable one that under certain conditions destroys bacteria with which it lives in symbiosis. That bacteria may be associated with a living virus capable of devouring them has already been shown in the case of the bacillus of dysentery in man and studies of bacteriophagy have also been made in other diseases of intestinal origin : typhoid, chicken cholera, etc. Already in 1921 d'Herelle claimed that in all such infections the outcome depends upon the struggle between the bacteriophages and the intestinal bacteria, and he seems to have proved that living bacteriophage may be injected into man and test animals. A number of patients affected with dysentery received doses of a pure culture of bacteriophage and in 24 hours were on the road to recovery.

It is evident from present developments of these studies that immunologists must henceforth reckon with this new theory.

XUM

Delbe, C.—Contribution to the Study of Ablation of the Mammary Gland in the Cow.—Thesis—*Rec de Méd. Vét.*, No. 19, Nov. 15th, 1925.

ABLATION of the mammary gland in the cow is advisable when it does not function properly physiologically, as a result of disease incurable by therapeutic means and causing the cow to waste away.

This operation necessitates a very careful dissection and ligaturing of the blood vessels with care; to avoid post-operative hæmorrhage it is necessary to doubly ligature each of the two arterio-venous pedicles and suturing also of the lower ligature; the large operation wound cicatrises proportionately quickly and without great suppuration.

When mammary lesions are incurable the operation ought to be practised, but only on subjects quite free from other pathological defects such as endocarditis, myocarditis, tuberculosis.

Assmann, Dr.—Therapeutic Treatment of Ringworm in Cattle.—*Deutsche Turärzt Wochenschrift*, Jan. 16th, 1926.

IN ringworm of cattle the best and quickest results were obtained with Baranski's ointment, then followed tincture of iodine, salicylic sulphur ointment, creolin ointment, Vienna tar liniment, naphtalin ointment, cresol liniment (Brandl Gineiner) and tar ointment.

Clipping of the cattle was not necessary since the hair of the Dutch cattle of East Prussia is rather thin and the skin very fine, whilst in the Simnenthalers the disease was on isolated subjects, sharply circumscribed and limited. With treatment of the animals disinfection of the stalls, harness and grooming utensils was carried out at the same time by using dilute creolin. After two to four applications of the remedies the irritation decreased considerably and soon disappeared entirely. Two of the attendants became infected, one on the left cheek in three places as large as a penny piece, which were healed after eight days' treatment with white precipitate ointment, and the other on the right forearm with a place as big as the palm of the hand, which healed after several paintings with sulfoliquid.

Watson, E. A. and Heath, L. M.—Tubercle-Bacillus Septicaemia in a Horse Caused by Bacilli of Avian Origin.—*Reprint from the American Review of Tuberculosis*, Vol. 12, No. 2, Oct., 1925.

THE authors state that they have searched the literature on tuberculosis without finding a single record of a case of this kind in

a horse. The infection here was so acute, intense and diffuse as to cause a fatal termination before any apparent localisation of infection or development of miliary tubercles had taken place.

McFadyean (*Journal of Comp. Path. and Therap.*, 225—1918) records a case of tuberculosis in a horse, remarkable " both on account of the peculiar nature of the lesions and because the bacilli found in these were proved to conform to what is termed the avian type of tubercle bacillus."

Calmette says (Tubercle Bacillus Infection and Tuberculosis), " In horses intravenous injection of avian cultures is very virulent and a generalised tuberculous process develops with more or less rapidity according to dose." The origin of our material was a flock of birds on a farm in the vicinity of Ottawa, in which tuberculosis was causing havoc. Three birds were sent to the laboratory. Two birds tested reacted to intradermal tests of bovine and avian tuberculin, and the third bird was the source of the strain isolated.

A mare at the research station was tested intradermally and by the complement fixation test and found to be free from tuberculosis. She was inoculated intravenously with one, two and five milligrammes of the avian bacilli culture on July 14th, 24th and August 7th. No clinical signs of ill-health were observed until after the third inoculation and samples of blood tested from July 14th to August 7th were negative. On August 9th there was a thermal reaction that went up to 105° F. on August 22nd to 27th. On August 15th and 19th the reaction was positive with the complement fixation test.

The mare died on August 27th showing marked distress and a dazed, semi-comatose condition. There was a frothy discharge from the mouth and a sanguinary exudate from the right nostril. Microscopic examination of material from the liver, spleen, kidneys and lungs showed incredible numbers of tubercle bacilli in every microscopic field.

Cultures and bacillary suspensions used on rabbits showed a like infection to that in the horse, guinea pigs resisted infection and white rats were only partly immune.

Kelly, F. C.—The Influence of Small Quantities of Potassium Iodide on the Assimilation of Nitrogen Phosphorus and Calcium in the Growing Pig.—*The Biochemical Journal*, Vol. 19, No. 4, 1925.

THE knowledge that the secretion of the thyroid is the most powerful stimulant of body metabolism known, and that for the efficient functioning of the thyroid a certain amount of iodine must be present has induced the author to experiment with potassium iodide on growing pigs. Young male pigs from two to four months old were used. 0.19 grammes of iodine daily was chiefly given in the form of 25 c.c. of a one per cent. solution of pot. iodide. One pig had 0.5 grammes of pot. iodide daily with beneficial effects.

In a feeding experiment on calves carried out on the farm of the Rowatt Research Institute it was found that a group of 12 getting potassium iodide in their ration, gained, in the same time, three and a half hundredweights more than a similar group which had no iodine.

The conclusion come to by the author is :—

Small amounts of iodine as pot. iodide added to the cereal rations used, led to an increased assimilation and retention of nitrogen and phosphorus in young growing pigs. Though the nitrogen and phosphorus retentions ran parallel to each other the effect of iodine was usually more marked in the case of nitrogen.

Translations

PATHOGENY AND TREATMENT OF ASCITES IN THE DOG.

By M. LESBOUYRIES *

ASCITES or hydropsy of the peritoneum is almost always a secondary affection. It is symptomatic sometimes of a lesion of the peritoneum itself, sometimes of one of the organs contained in the abdomen (liver, spleen, ovary, kidney) or situated outside this (lungs, heart).

The venous irrigation of the cœliac cavity where the liquid is poured out belonging almost entirely to the portal system, ascites is generally produced when this is obstructed, maybe, directly—an obstacle situated at one of its points—maybe indirectly by a lesion existing in the great circulation. The obstacle to the circulation of

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the blood in the portal veins may be a tumour, a hypertrophied gland, a thrombosis of the portal trunk ; but it is generally brought about by a hepatic alteration which compresses the capillaries and involves venous stasis. Disturbances of the peritoneal circulation may have a more distant origin : chronic affections of the lung, of the kidney causing an increased activity of the heart, of which asystole, then ascites are the more or less late results.

But these explanations of the pathogeny of dropsy are far from being satisfactory, and one is forced more and more to admit that purely mechanical circulatory troubles do not in themselves explain the production of the ascites : it is a fact that the liquid poured out is neither plasma, nor serum, nor pure lymph. Ascites is observed in all species of animals, including birds, but with marked frequency in the dog by reason of its habitual tuberculous disposition : in 50 per cent. of cases hydropsy of the peritoneum accompanies tuberculosis. For many years we have carefully carried out the autopsy of dogs dead of tuberculosis, and in those which showed ascites we have only rarely seen peritoneal lesions which in these cases could be attributed to repeated tappings which brought about at one time or other infection and inflammation of the serosa. The liquid drawn off at a first puncture is most often citron coloured and clear ; at length it loses its limpidity, becomes yellowish or slightly hæmorrhagic, which is due to secondary inflammation brought about by the tapping. When one opens the abdominal cavity of an ascitic dog not having undergone paracentesis one encounters organs macroscopically healthy : the glands, the kidneys are apparently normal ; the liver alone is generally hypertrophied. In a dog affected with hepatic tuberculosis, one does not meet with a fatal hepatic outflow. The very fine lesions of cirrhosis are not always hydropigenous. With regard to ascites of cardiac origin, its frequency has not been demonstrated and we have only seen one dog affected with exudative pericarditis and ascites.

After having come to the conclusion, after long years of experience, that we are powerless to interpret the pathogeny of dropsy of the peritoneum we have come across a new indication from points we have gathered from the formation of œdemas in anasarca of the horse. Having had the care of horses affected with anasarca stubbornly resisting etiological treatment (antistreptococcic serum) we have had recourse to calcium chloride, whose therapeutic properties have been demonstrated chiefly by Blum and Strasbourg. By intravenous injections in doses of 20 to 30 grammes daily in isotonic solution (20 grammes per 1,000) the chloride of calcium provokes an abundant diuresis in a few hours which allows of the excretion by the kidneys

XUM

of two of the constituents of œdema, namely, the chloride of sodium and the water necessary for its dissolution: the ion calcium is substituted for the ion sodium, displacing it from places where it has accumulated carrying away with it a certain quantity of water. There is in evidence a hydrochloride retention from renal impermeability due to a nephritis, since this permeability to chloride of sodium is almost instantaneously recovered by the administration of chloride of calcium. In our opinion there is tissulary retention produced by a toxic impregnation of cells which, when altered, liberate albuminoid and saline molecules. The cure of anasarca by calcic treatment induced us to try it on dogs with ascites which also often show œdemas.

In a tuberculous ascitic dog the proportion of chlorides by the Charpentier-Volhard method, indicates a reduced cypher of 1·7 gramme per litre of urine, whereas the quantity in the normal dog varies between seven and nine grammes; the urine is dark coloured and scanty. Ingestion during two consecutive days of two grammes of chloride of calcium causes the cypher of the urinary chlorides to ascend, the urine remaining dark coloured and scanty. A fresh ingestion of ten grammes of chloride of calcium causes appreciable diuresis in a few hours, and the same evening the urine contains 6·5 grammes per 1,000 of chloride of sodium; the same day voluminous œdemas appear on the posterior limbs. On the morrow the cypher of urinary chlorides reaches 14·07; the ascitic liquid remaining copious tapping brings away five litres of a liquid which contains 4·5 grammes of chloride of sodium per litre. Under the action of repeated tappings and the administration of 15 to 20 grammes of chloride of calcium daily the peritoneal outflow forms less quickly, whilst extensive œdemas form on the sides and in the region of the sheath. Twenty days after the first trial of the treatment there no longer remain any œdemas, these disappearing in 48 hours. Kept for three weeks without treatment this dog had no return of the ascites; at the autopsy—the animal having been destroyed—there was not a drop of liquid in the peritoneal cavity which contained quite healthy organs; in the thoracic cavity the essential lesion is a pericarditis with abundant exudation. The second animal on which we experimented was a dog affected with non-tuberculous ascites: its urine contained 1·9 of chloride of sodium per litre. Whilst the peritoneal cavity was emptied by puncture, we administered to the patient 10 grammes of calcium chloride; the calcic treatment which provoked a marked diuresis was renewed for four days, at the end of which time the ascites had totally disappeared and the cypher of urinary chlorides was raised to over nine grammes. The animal was

sacrificed at the request of the owner and presented lesions of subacute hypertrophying enteritis.

A third dog which we had attended was an animal affected for a long time with non-tuberculous recurrent ascites. His urine only contained 2·5 of chloride of sodium per litre. In this case paracentesis was not practised. We were content to give 10 to 15 grammes of chloride of calcium by the mouth daily; in five days the ascites had vanished and the dog was returned to his master.

From the facts stated it would seem that there are a number of cases of ascites susceptible to amelioration, if not cure by treatment with *chloride of calcium in large doses*. It is probable that relapses may occur against which the calcic treatment is always indicated; instead of timidly using calcium chloride in doses of seven to 30 grains daily we have used it in doses of 157 to 374 grains (10 to 20 grammes) without any other effect on the dog except slight constipation. These necessary quantities in the treatment of ascites are perhaps worthy of trial in grave hæmorrhages and notably in typhus.

[Most veterinary surgeons meet with periodical cases of ascites in the dog. We shall be glad to have reports where the procedure advocated in the above article has been tried.—TRANSLATOR.]

Reviews

Veterinary Science and Animal Breeding.

WE are in receipt of specimen proof sheets of the above work, which takes the form of an encyclopædia with the subjects arranged in alphabetical order.

The editors, Professor Dr. Valentin Stang and Professor Dr. David Wirth, of the Veterinary Schools of Berlin and Vienna respectively, have had in collaboration with them over 120 specialists who contribute to this publication, and we remark that with the exception of one Japanese, these are confined to Continental writers—British and American authorities being conspicuous by their absence.

The result is a comprehensive work of eight volumes, covering a wide range of scientific knowledge. It should prove a valuable addition to the libraries of those who have occasion to consult books of reference of this nature, and who desire to possess exact information on these subjects presented in a readily accessible form. Tierheilkunde und Tierzucht, Stang und Wirth (Urban & Schwarzenberg, Berlin and Vienna).

H.A.R.

Naturgeschichte der tierischen Parasiten des Menschen. By M. BRAUN. (**Die tierischen Parasiten des Menschen. Die von ihnen hervorgerufenen Erkrankungen und ihre Heilung. Erster Tiel.**) By M. BRAUN and O. SEIFERT.) The Life-histories of the Animal

Parasites of Man. (The Animal Parasites of Man. The Diseases caused by them and their Cure. First Part. By M. BRAUN and O. SEIFERT.) 6th enl. and revd. edn., x×608 pp., 416 figs. Leipzig, Curt Kabitzsch, 1925. Price Mks. 19·50 paper, Mks. 21·60 bound.—*Review of Applied Entomology*, p. 10, January, 1926.

THIS work discusses the various forms of parasitism and parasites, the latter being dealt with in their various groups, including mites and insects. Sufficient characters are given to enable the different Arthropods dealt with to be recognised, with occasional brief notes on the life-history, though the latter are not always given for the more important species. There is a bibliography of 105 pages, of which 15 are devoted to Arthropods, giving full references to the originals cited in the text.

A Tentative Arrangement of the Muscoid Flies based on the Puparia. By C. T. GREENE. U.S. Bur. Ent. *Proc. Ent. Soc. Wash.*, xxvii, No. 8, pp. 157–163, 1 pl., 2 refs. Washington, D.C., November, 1925.

THIS grouping of the Muscoid flies is based on a study of about 400 species, which are divided into the families Tachinidæ, Dexiidæ, Sarsophagidæ, Oestridæ, Calliphoridæ and Muscidæ, including Anthomyiidæ. The principal adult character used is the arista of the antenna, whereas that of the puparium is the posterior spiracular plate. Both these characters appear to be constant for a species, while the characters of the puparia allow of a satisfactory division into family groups and species, but are not suitable for defining genera. A few heterogeneous groups between the family and species can be defined, but from this study of the puparia it would seem probable that too many genera have been made for the adults. In some cases the characters of the larvæ are also described, and a brief outline of their habits is given under each family.

A Practical Handbook on Rat Destruction. By C. LEOPOLD CLAREMONT, B.Sc., F.I.C. London: John Hart. pp. 190.

THIS is a very useful little book, containing in a very readable form all the various poisons in use in different parts of the world for the destruction of that ubiquitous and objectionable little animal, the rat. It explains very clearly, and with the use of illustrations, the methods by which attempts at rat destruction are carried out. And it also gives the precautions to be taken to prevent the various domesticated animals from becoming involved when these poisons are used. It refers in detail to the Rats and Mice Destruction Act, and to the good work which was done at the Rat Research Laboratory of the Ministry of Agriculture, and to the collaboration which was generously given by the officials of the British Museum of National History. The destruction of the rat is a worthy object, as the amount of human food which this animal consumes, not to speak of its danger as a factor in the spread of disease, is simply appalling, and has claimed the attention of the general public, as well as of the Government Departments. In connection with this the author might have added to the value of his book by alluding to the propaganda work which has been done by certain rat destruction societies, particularly the Vermin Repression Society, whose Chairman (Lord Aberconway) and indefatigable Secretary (Mr. Moore Hogarth) did so much to assist the

Bill in its passage through Parliament. The failure to exterminate the rats from this country is not now due to the want of knowledge or the want of legislation. It is largely owing to the apathy of the general public, and the apparent powerlessness of the government officials to enforce regulations of the Act. Every veterinarian should be acquainted with the formulæ of rat baits. These are summarised in detail on pages 183-186 inclusive.

Third Report by the Government Institute for Veterinary Research. Fusan, Chosen, Japan, 1925.

VETERINARY research in Japan has, for a number of years, been under the ægis of the government, and a good deal of observational work on the diseases of animals has been carried out. It is our loss in Great Britain that when the Japanese veterinary graduate is sent over by his Government to Europe for post-graduate study, it is usual for either Germany or France to be selected in preference to this country. The Government Institute for Veterinary Research is under the direction of Dr. Takizo Mochizuki, and his staff consists of a number of veterinary and medical scientists, whose collaboration of work turn out some very valuable material. The present number contains three articles which would be of particular interest to our colleagues in the Colonies. One is a series of experimental studies on the Prophylactic Inoculation against Rinderpest, the second is against Contagious Bovine Pleuropneumonia, and the third on Experimental Studies into the Effects of Polished Rice Feeding, and its Vitamin B-Defect in the Horse. The first and third are written in English, so that they will be understandable to most of our readers who care to peruse them.

The Dog Encyclopaedia. By WILLIAM LEWIS JUDY. Chicago: The Judy Publishing Co., 1925. $2.00.

THIS American publication, by the Editor of the *Dog World Magazine* is mainly intended for the dog breeder and owner, and it contains in its 184 pages a list of all the principal breeds, with illustrations, together with many useful hints on the hygiene and general kennel management of dogs. Its attempts at veterinary treatment are only primitive, and intended as first-aids. As a work of interest to the practitioner who has a large canine *clientele* it is useful, and as an illustration of the phonetic spelling which is apparently in use in some of the publications of our American cousins, it is decidedly amusing.

The Auditory Apparatus of the Common Mole—Talpa europaea. By H. C. WILKIE, F.R.C.V.S., F.R.M.S., F.Z.S. Proc. Zool. Soc., Part 4, 1925.

MR. H. C. WILKIE, who is perhaps better known to-day through his talent as an artist and exhibitor in British and Continental galleries, has contributed a valuable paper to the Proceedings of the Zoological Society of London on the Auditory Apparatus of the Common Mole.

The work appears to have been prompted by " the many observations which have been made at different times and which tend to show that this animal is endowed with an exceptional acuteness of the sense of hearing."

XUM

The text is illustrated by anatomical sketches executed by the author.

Not the least interesting portion of the paper is that dealing with the methods of making histological preparations for the study of the membranous canals and their appendages.

The author is to be congratulated on having accomplished a task demanding skill in dissection and the exercise of an immense amount of patient study.

By recording his observations, Mr. Wilkie has rendered a service which will be appreciated by naturalists generally and by all students of comparative anatomy. H.A.R.

Personal

The congratulations of the profession will be given to MR. FRED BULLOCK, the popular and indefatigable secretary of the Royal College of Veterinary Surgeons, who has secured the sixth place in the Second Honours (this really means eighth in actual order of merit, out of 89 candidates as there were only two in the First Class) in the final examination for "Called to the Bar."

Mr. Bullock will be formally "called" as a barrister on the 16th of June, at Gray's Inn.

Notices

R.A.V.C. ANNUAL DINNER.

THE Annual Dinner of the Officers of the Royal Army Veterinary Corps will be held at the Hotel Cecil, on Friday, the 18th June, 1926, at 8 p.m.

Officers of the Militia, Territorial Army and Temporary Officers who served in the Great War are eligible to attend.

Subscription.—Subscribers, 15s.; Non-subscribers, £1 10s. 0d. Gentlemen desirous of attending should inform the Honorary Secretary, R.A.V.C. Dinner, War Office, Whitehall, London, S.W.1.

A National Milk Conference, Subject: "Milk in Relation to Public Health," will be held in the King George's Hall, Caroline Street, Great Russell Street, W.C.1, on Tuesday, June 8th, 1926. Particulars can be obtained from the Secretary, 3, Bedford Square, W.C.1.

AGRICULTURAL AND VETERINARY RESEARCH SCHOLARSHIPS.

THE Ministry of Agriculture and Fisheries invites applications for research scholarships in agricultural and veterinary science. The number to be awarded will not exceed seven and will depend upon the qualifications of the candidates. The scholarships are tenable for three years from 1st October, 1926, and are of the value of £200 per annum; extra allowances may be made for travelling and subsistence for periods spent abroad. Applications must be received not later than *30th June*, 1926, on the prescribed form (900/T.G.) which, together with a copy of the conditions attaching to the scholarships, may be obtained from the Secretary, Ministry of Agriculture and Fisheries, 10, Whitehall Place, London, S.W.1.

XUM